

Application No. 09/903,215
Amendment dated December 27, 2006
Reply to Office Action of October 2, 2006

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (withdrawn): A multi-component nonwoven fabric for use in disposable absorbent articles, said fabric comprising:

an upper, liquid-acceptance layer having an upper surface for receiving liquids introduced into said absorbent article, said upper layer comprising fibers selected from thermoplastic polymers, splittable thermoplastic fibers, or cellulosic fibers,

said upper surface of upper layer defining an array of upstanding projections extending above a network of liquid-accepting channels surrounding said upstanding projections; and

a next liquid-distribution layer juxtaposed to said upper layer, and hydroentangled therewith in liquid-transferring relationship for receiving liquid from said upper layer for distribution to said absorbent article,

said next layer comprising a blend of fibers including: (1) fibers selected from the group consisting of thermoplastic polymers, (2) profiled thermoplastic fibers, or (3) cellulosic fibers.

Claim 2 (withdrawn): A multi-component nonwoven fabric in accordance with claim 1, including:

a lower liquid-retention layer juxtaposed to said liquid-distribution layer on the side thereof opposite said liquid-acceptance layer, said liquid-retention layer being hydroentangled in liquid-transferring relationship with said liquid-distribution layer, said liquid-retention layer at

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least partially comprising cellulosic fibers selected from the group consisting of wood pulp fibers, rayon fibers, and blends thereof.

Claim 3 (withdrawn): A multi-component nonwoven fabric in accordance with claim 2, wherein:

 said liquid-retention layer comprises a blend of said cellulosic fibers and thermoplastic polymer fibers having a denier of between about 6 and 18.

Claim 4 (withdrawn): A multi-component nonwoven fabric in accordance with claim 3, wherein:

 thermoplastic polymers are selected from the group consisting of polyolefins, polyesters, polyamides, and blends thereof.

Claim 5 (withdrawn): A multi-component nonwoven fabric in accordance with claim 4, wherein:

 polyolefins are selected from the group consisting of polypropylene, polyethylene, and blends thereof.

Claim 6 (withdrawn): A multi-component nonwoven fabric in accordance with claim 4, wherein:

 polyesters are selected from the group consisting of polyethylene terephthalate, polybutylene terephthalate, and blends thereof.

Claim 7 (withdrawn): A multi-component nonwoven fabric in accordance with claim 4, wherein:

 polyamide include nylon.

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Claim 8 (withdrawn): A multi-component nonwoven fabric in accordance with claim 2, wherein:

 said next layer comprises a blend of fibers including: (1) fibers having a denier of about 6 to 18 selected from the group consisting of thermoplastic polymers, (2) profiled thermoplastic fibers, or (3) cellulosic fibers.

Claim 9 (withdrawn): A multi-component nonwoven fabric in accordance with claim 1, wherein:

 said liquid-distribution layer extends into said array of projections defined by the upper surface of said liquid-acceptance layer.

Claim 10 (withdrawn): A multi-component nonwoven fabric in accordance with claim 2, wherein:

 a lower surface of said liquid-retention layer, opposite said liquid-distribution layer, is surface-napped for enhanced loft.

Claim 11 (withdrawn): A multi-component nonwoven fabric in accordance with claim 1, wherein:

 said fabric defines a plurality of apertures extending from said network of liquid-accepting channels through said lower liquid-distribution layer.

Claim 12 (currently amended): A method of making a multi-component nonwoven fabric, comprising the steps of:

 forming a layered precursor fibrous web including a first fibrous layer comprising fibers selected from the group consisting of polypropylene, polyester, polyethylene terephthalate, and nylon and having a basis weight between about 0.5 and 1.5 ounces/yd², and a second fibrous

layer comprising a blend of fibers including (1) fibers having a denier of about 6 to 18 selected from the group consisting of polyolefins, polyesters, and polyamides, and (2) heat-fusible fiber, said second layer having a basis weight between about 0.5 and 1.0 ounces/yd²;

providing a three-dimensional image transfer device having a foraminous forming surface defining an array of surface depressions;

positioning said precursor fibrous web on said image transfer device with said first fibrous layer positioned adjacent said foraminous forming surface,

hydroentangling said precursor web whereby said precursor web is imaged and patterned on said image transfer device, to thereby form a multi-component nonwoven fabric with a three-dimensional image in said first fibrous layer only, said image comprising an array of upstanding projections and a network of liquid-accepting channels, and,

drying said nonwoven fabric at an elevated temperature, including activating said heat-fusible fibers, whereby said heat-fusible fiber stabilizes the nonwoven fabric and enhances retention of said three-dimensional image,

said first fibrous layer forming a liquid-acceptance layer of said fabric having an said array of upstanding projections that minimize contact with a user to promote comfort, and to promote fluid management, said array of upstanding projections extending above a said network of liquid-accepting channels, said array of projections corresponding to said array of surface depressions defined by said foraminous forming surface, said second fibrous layer forming a liquid-distribution layer, devoid of said upstanding projections and said liquid-accepting channels, of said fabric, wherein said liquid-distribution layer is juxtaposed to said liquid-acceptance layer and hydroentangled therewith in liquid-transferring relationship.

Claim 13 (previously presented): A method of making a multi-component nonwoven fabric in accordance with claim 12, including:

forming said precursor web with a third fibrous layer at least partially comprising cellulosic fibers selected from the group consisting of wood pulp fibers, rayon fibers, and blends thereof, said second fibrous layer being positioned between said first and third fibrous layers, said hydroentangling step including forming said third fibrous layer as a liquid-retention layer of said fabric.

Claim 14 (previously presented): A method of making a multi-component nonwoven fabric in accordance with claim 13, including:

forming said third fibrous layer from a blend of said cellulosic fibers and fibers having a denier about 6 and 18 selected from the group consisting of polyesters, polyolefins, and polyamides fibers.

Claim 15 (previously presented). A method of making a multi-component nonwoven fabric in accordance with claim 13, including:

forming said liquid-retention layer with superabsorbent polymer therein.

Claim 16 (previously presented): A method of making a multi-component nonwoven fabric in accordance with claim 15, including:

providing said superabsorbent polymer in a fibrous form in said third fibrous layer of said precursor web, and

drying said nonwoven fabric at an elevated temperature to activate said superabsorbent polymer.

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Claim 17 (previously presented): A method of making a multi-component nonwoven fabric in accordance with claim 13, including:

surface napping said liquid-retention layer.

Claim 18 (previously presented): A method of making a multi-component nonwoven fabric in accordance with claim 12, including:

forming a plurality of apertures extending from said network of liquid-accepting channels through said liquid-acceptance and liquid-distribution layers.

Claim 19 (currently amended): A method of making a nonwoven fabric, comprising the steps of:

forming a precursor fibrous web having a cellulosic layer at least partially comprising cellulosic fibers selected from the group consisting of wood pulp fibers, rayon fibers, and blends thereof;

providing a three-dimensional image transfer device having a foraminous forming surface;

positioning said precursor fibrous web on said image transfer device;

hydroentangling said precursor web whereby said precursor web is imaged and patterned to form said nonwoven fabric having an absorbent capacity, as a percentage of fabric weight, to thickness ratio of at least about 6.7, and

forming a layered precursor web including a first fibrous layer comprising fibers selected from the group consisting of polyolefins, polyesters, and polyamides, and a second fibrous layer comprising a blend of fibers including: (1) fibers selected from the group consisting of

polyolefins, polyesters, and polyamides, and (2) heat-fusible fibers, said second fibrous layer being positioned between said first fibrous layer and said cellulosic layer,

 said hydroentangling step acting to hydroentangle said layers in liquid-transferring relationship, whereby said first layer provides a liquid-acceptance layer of said fabric, said second layer provides a liquid-distribution layer of said fabric, and said cellulosic layer provides a liquid-retention layer of said fabric,

 including forming a surface of said liquid-acceptance layer only among said liquid-acceptance layer, said liquid distribution layer and said liquid-retention layer, with a three-dimensional image including an array of upstanding projections extending above a network of liquid-accepting channels surrounding said projections, and said liquid-distribution layer and said liquid-retention layer being devoid of said upstanding projections and said liquid-accepting channels; and

 drying said nonwoven fabric at an elevated temperature, including activating said heat-fusible fibers, whereby said heat-fusible fibers stabilize the nonwoven fabric and enhance retention of said three-dimensional image.

Claim 20 (original): A method of making a nonwoven fabric in accordance with claim 19, including:

 forming said nonwoven fabric with superabsorbent polymer therein.

Claim 21 (original): A method of making a nonwoven fabric in accordance with claim 19, including:

 providing said superabsorbent polymer in a fibrous form in said precursor web, and

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drying said nonwoven fabric at an elevated temperature to activate said superabsorbent polymer.

Claim 22 (canceled).

Claim 23 (canceled).

Claim 24 (original): A method of making a nonwoven fabric in accordance with claim 19, including:

surface-napping said nonwoven fabric to enhance the loft thereof.

Claim 25 (withdrawn): A nonwoven fabric formed in accordance with the method of claim 19.

Claim 26 (withdrawn): A disposable absorbent article, comprising:

a multi-component nonwoven fabric; and

a liquid impermeable backsheet,

said nonwoven fabric comprising an upper, liquid-acceptance layer having an upper surface for receiving liquids introduced into said absorbent article, said upper layer comprising fibers selected from thermoplastic polymers, splittable thermoplastic fibers, or cellulosic fibers, said upper surface of upper layer defining an array of upstanding projections extending above a network of liquid-accepting channels surrounding said upstanding projections, and a liquid-distribution layer juxtaposed to said upper layer, and hydroentangled therewith in liquid-transferring relationship for receiving liquid from said upper layer for distribution to said absorbent article, said distribution layer extending into said array of projections defined by the upper surface of said liquid-acceptance layer,

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said liquid-distribution layer comprising a blend of fibers including: (1) fibers selected from the group consisting of thermoplastic polymers, (2) profiled thermoplastic fibers, or (3) cellulosic fibers.

Claim 27 (withdrawn): A disposable absorbent article in accordance with claim 26, including:

a lower liquid-retention layer juxtaposed to said liquid-distribution layer on the side thereof opposite said liquid-acceptance layer, said liquid-retention layer at least partially comprising cellulosic fibers selected from the group consisting of wood pulp fibers, rayon fibers, and blends thereof.

Claim 28 (withdrawn): A disposable absorbent article in accordance with claim 27, wherein:

said liquid-retention layer is hydroentangled in liquid-transferring relationship with said liquid-distribution layer.

Claim 29 (withdrawn): A disposable absorbent article in accordance with claim 27, wherein:

said liquid-retention layer includes superabsorbent polymeric material.

Claim 30 (withdrawn): A disposable absorbent article in accordance with claim 26, wherein:

said fabric defines a plurality of apertures extending from said network of liquid-accepting channels through said lower liquid-distribution layer.

Claim 31 (previously presented). A method of making a multi-component nonwoven fabric in accordance with claim 12, wherein:

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said network of liquid-accepting channel surrounds said projections.

Claim 32 (previously presented). A method of making a multi-component nonwoven fabric in accordance with claim 19, wherein:

said network of liquid-accepting channel surrounds said projections.